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None

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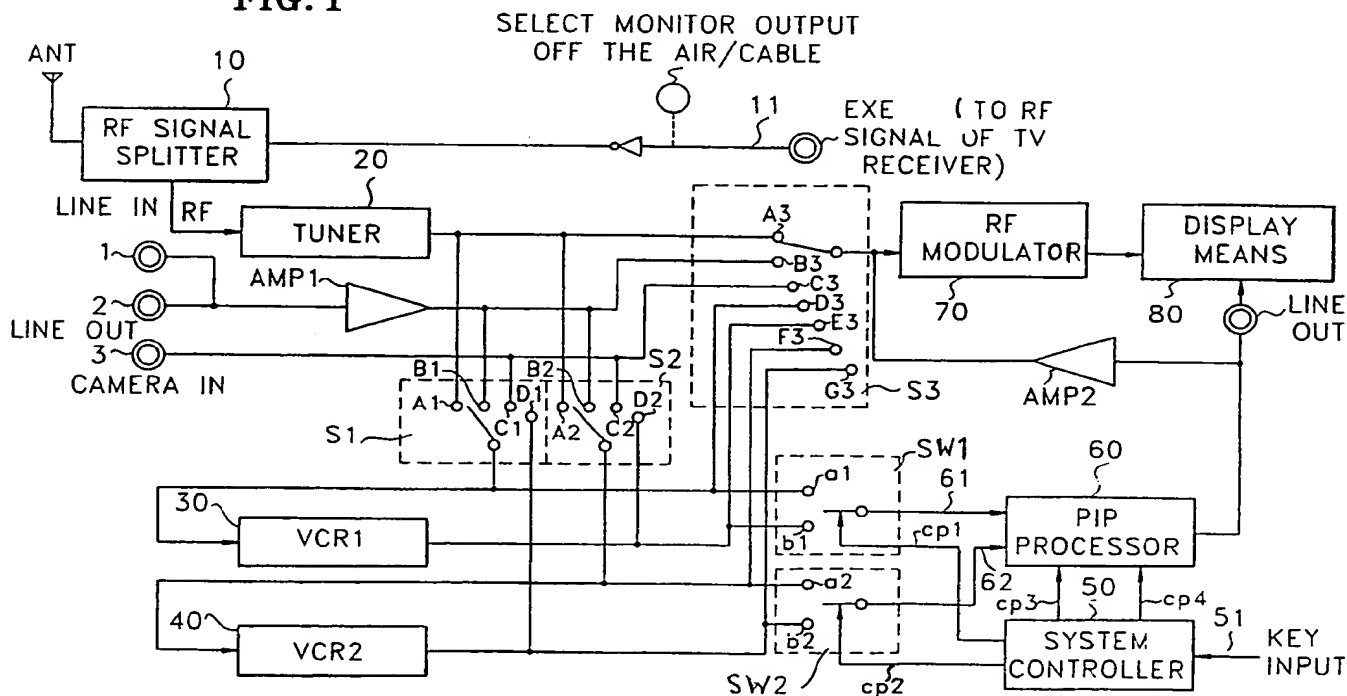
INT CL<sup>5</sup> H04N 5/262 5/45

Online databases: WPI

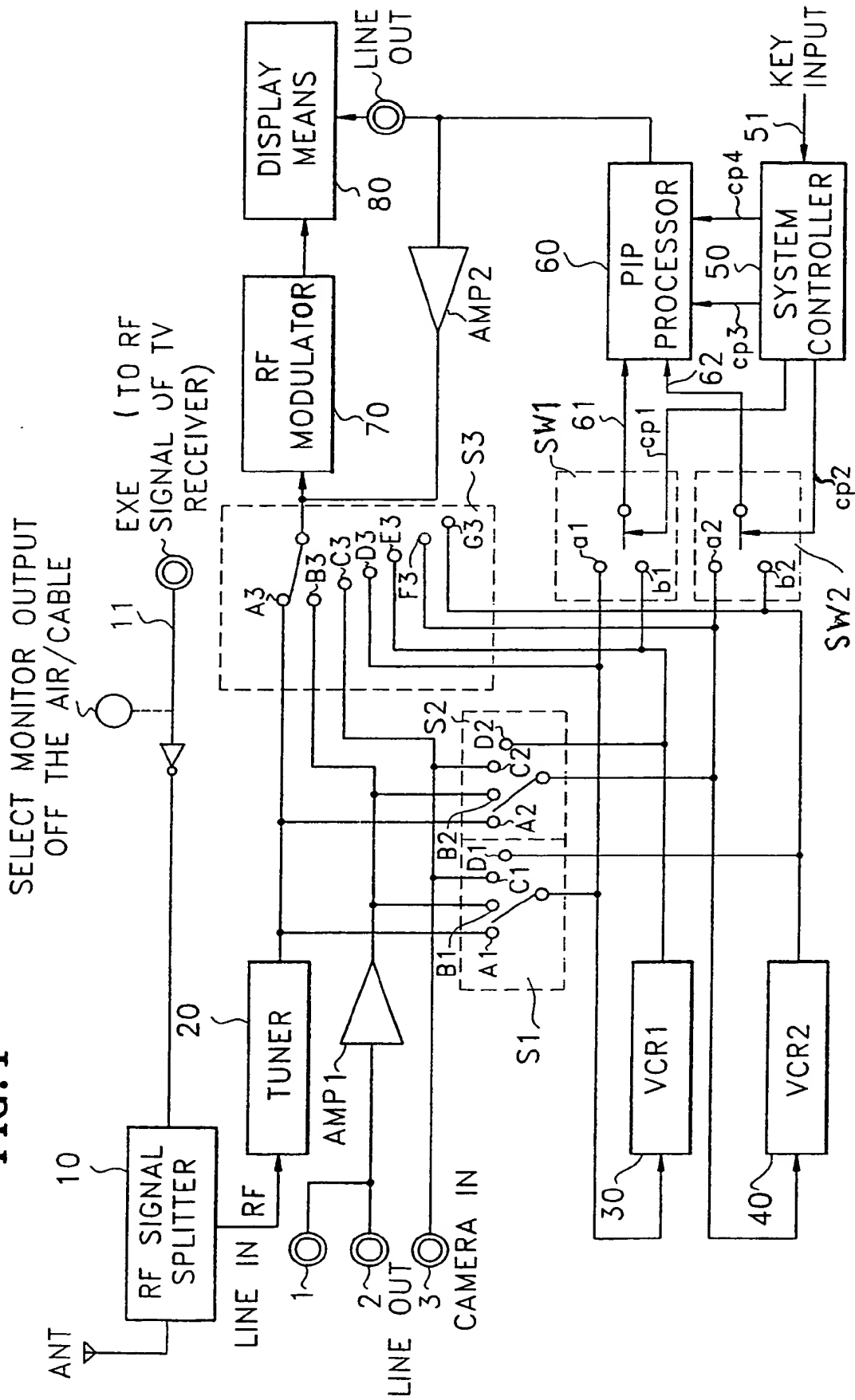
(54) Dual-deck video tape apparatus with PIP function

(57) A dual deck video tape apparatus having a PIP function has a first and a second deck 30, 40 combined as one unit. This apparatus is able to display simultaneously signals being recorded or reproduced in the respective decks by incorporating a main picture and secondary picture through a PIP processor 60. This is accomplished by receiving, as main and secondary picture signals, according to the switching of a control switch SW1, SW2, a recording or playback signal of either the first deck 30 where a signal is selected for recording among video signals input via a multi-channel signal input source and the playback signal of the second deck 40, or the second deck 40 where a signal is selected for recording among video signals input via the multi-channel signal input source and the playback signal of the first deck 30.

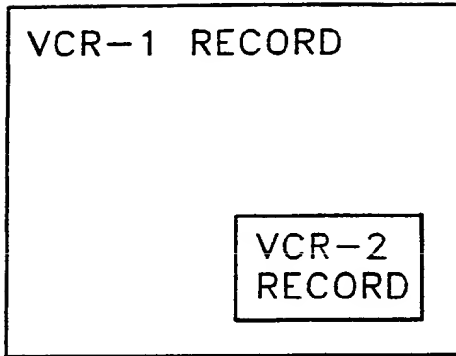
FIG. 1



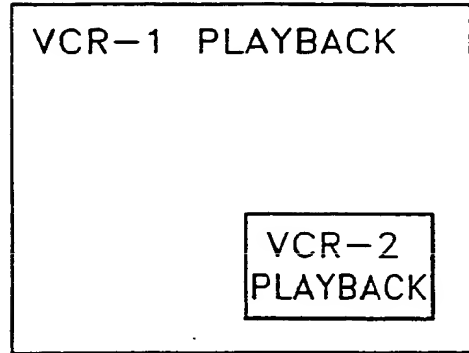
**FIG. 1**



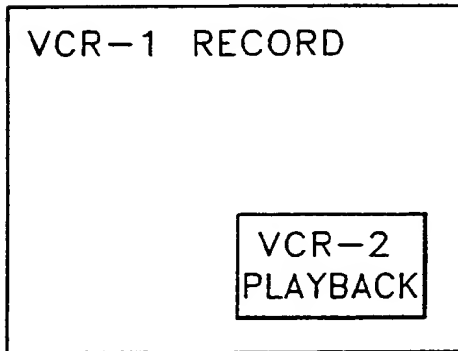
**FIG. 2A**



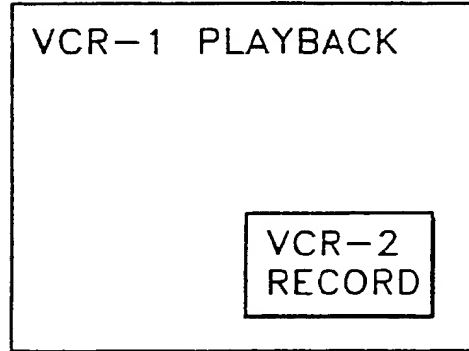
**FIG. 2B**



**FIG. 2C**



**FIG. 2D**



**DUAL DECK VIDEO TAPE APPARATUS**

The present invention relates to a dual deck video tape apparatus having a PIP function in a video apparatus.

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One type of video tape reproducing apparatus, generally called a dubbing apparatus, reproduces information recorded on a video tape to another recording medium. Such a reproduction apparatus is being widely used, wherein two video tape recording and playback apparatuses are serially connected. Specifically, apparatus comprising a tandem pair of recording and playback apparatuses (hereinafter referred to as dual deck) as one unit is called a dual deck video tape recorder (hereinafter referred to as a dual deck VTR).

15 A conventional dual deck VTR uses two decks. Each deck consists of a recording section for recording image information on a video tape and a playback section for reproducing the image information recorded on a video tape. One deck reproduces image information via a playback section and the other deck records image information via a recording section. The two decks record or reproduce using differing formats, execute such functions as simultaneous recording broadcast signals from a multi-channel source, and are constructed to display recorded or reproduced signals via a display apparatus.

25 Such an apparatus having a construction as explained above is disclosed in U.S. Patent No. 4,768,110. The disclosed apparatus makes it possible to output via a monitor signals previously recorded onto a tape in one deck, even while another is recording an image signal supplied from a multi-channel signal input source onto a blank tape.

However, in order for a monitor viewer to recognize the signals as being recorded or reproduced in either of the above decks, the viewer is encumbered by switching between the recording and playback signal output terminals of each deck via a selection switch.

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To overcome the problem explained above, preferred embodiments of the present invention aim to provide a video tape apparatus having two decks as one unit, for simultaneously displaying the signals being recorded or reproduced in the two decks by using a PIP function.

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According to one aspect of the present invention, there is provided a dual deck video tape apparatus having a PIP function, including as one unit a first and a second deck each for recording and reproducing a video signal, the apparatus comprising:

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input means including a tuner for tuning a broadcasting signal input via an antenna to an appropriate channel, a terminal for receiving a video signal via a video line, and a terminal for receiving a video signal from a video camera;

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first input selection means for selecting either one of a video signal being transmitted to a multi-channel source of said input means or a playback signal of said second deck and inputting the signal to said first deck;

25

second input selection means for selecting either one of a video signal being transmitted to said multi-channel source of said input means or a playback signal of said first deck and inputting the selected signal to said second deck;

first and second switching means to switch between a recording signal and a playback signal of said first and second deck;

5 PIP means for receiving a signal switched by either one of said first and second switching means as a video signal for a main picture and a signal switched by either one of said first and second switching means as a video signal for a secondary picture, compressing said video signal of said secondary picture, and then displaying said signals as the respective main picture and secondary picture of a display means; and

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system control means for controlling the switching of signal input sources for the respective main picture and secondary picture of said PIP means by way of controlling switching of said first switching means and second switching means, and controlling the operation of said PIP means by  
15 recognizing key data from a key input means.

Preferably, each of said first and second switching means consists of a control switch.

20 The apparatus may further comprise:

output selection means for selecting one of video signals being transmitted to said multi-channel source of said input means, a recording signal or playback signal of said first deck, or a recording signal or playback  
25 signal of said second deck; and

RF modulating means for modulating a signal selected through said output selection means into a high-frequency signal and outputting the signal to said display means.

- 5            Preferably, both the main picture signal and secondary picture signal output from said PIP processing means are supplied to said RF modulating means to be displayed on said display means.

- 10           According to another aspect of the present invention, there is provided a dual deck video tape apparatus comprising, as a single unit:

first and second decks each for recording and reproducing a video signal;

- 15           an image processing means for mixing two input signals of two respective input images and generating therefrom an output signal of an output image comprising the two input images as distinct images; and

- 20           control means for selecting said two input signals, under the control of a user, from input and output signals to and from said first and second decks, and external signals input to said apparatus.

- 25           Such an apparatus may further comprise any one or more of the features disclosed in the accompanying specification, claims, abstract and/or drawings, in any combination.

For a better understanding of the invention, and to show how the same may be carried into effect, reference will now be made, by way of example, to the accompanying diagrammatic drawings, in which:

5           Figure 1 is a block diagram of one embodiment of a dual deck video tape apparatus having a PIP function according to the present invention; and

          Figures 2A through 2D illustrate various picture conditions displayed on a display apparatus.

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          Together with the accompanying illustrative drawings, a detailed explanation will now be given of a preferred embodiment of a dual deck video tape apparatus having a picture-in-picture (PIP) function according to the present invention.

15

          Referring to Figure 1, the input of an RF signal splitter 10 is connected to an antenna ANT, while a first output thereof is connected to an external terminal EXE to which an RF signal of a TV receiver is input, and a second output is connected to an input of a tuner 20.

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          A first selection terminal A1 of a first input selection switch S1 is connected to the output of tuner 20, while a second selection terminal B1 is connected to the output of an isolation amplifier AMP1 whose input is connected to video input/output terminals 1 and 2. A third selection terminal  
25   C1 is connected to a camcorder signal input terminal 3 to which an image signal which has been processed in a video camera (a so-called camcorder) is input. A fourth selection terminal D1 is connected to the output of a second



deck 40. The fixed (common) terminal of first input selection switch S1 is connected to the input of a first deck 30.

Likewise, for a second input selection switch S2, a first selection terminal A2 is connected to the output of tuner 20, while a second selection terminal B2 is connected to the output of isolation amplifier AMP1. A third selection terminal C2 is connected to camcorder signal input terminal 3. A fourth selection terminal D2 is connected to the output of first deck 30. The fixed terminal is connected to the input of second deck 40.

Also, a first selection terminal A3 of an output selection switch S3 is connected to the output of tuner 20. A second selection terminal B3 is connected to the output of isolation amplifier AMP1. A third selection terminal C3 is connected to camcorder signal input terminal 3. Fourth and fifth selection terminals D3 and E3 are also connected to the input and output of first deck 30, respectively. Sixth and seventh selection terminals F3 and G3 are also connected to the input and output of second deck 40, respectively. The common terminal of output selection switch S3 is connected to the input of an RF modulator 70.

The fixed contact of a first control switch SW1 is connected to a main picture input 61 of a PIP processor 60. First and second selective contacts a1 and b1 are connected to the input and output of first deck 30, respectively.

The fixed contact of a second control switch SW2 is connected to a secondary picture input 62 of PIP processor 60. First and second selective contacts a2 and b2 are connected to the input and output of second deck 40, respectively.

An input 51 of a system controller 50 receives key data which is transmitted from a key input means. Outputs of system controller 50 include first and second control ports cp1 and cp2 connected to the respective control contacts of the first and second control switches SW1 and SW2, and third and fourth control ports cp3 and cp4 connected to selection control signal inputs of PIP processor 60 for main and secondary picture, respectively.

Finally, a first input of a display means 80 is connected to an output from RF modulator 70, and a second input thereof is connected to an output of PIP processor 60. The input of a second amplifier AMP2 is also connected to the output of PIP processor 60, while the output thereof is connected to the input of RF modulator 70.

Now, a more detailed explanation will be given of the operation of the apparatus as shown in Figure 1.

RF signal splitter 10 transmits VHF/UHF signals from channels 2 through 83 input via antenna ANT to tuner 20 and a television monitor. In the tuner 20, under control of system controller 50 which has recognized key data from a key input means, an image signal corresponding to the selected channel is selected and transmitted to first input terminals A1, A2 and A3 of first and second input selection switches S1 and S2, and output selection switch S3, respectively.

An image signal input from video input/output terminals 1 and 2 is fed through isolation amplifier AMP1 to second input terminals B1, B2 and B3 of first and second input selection switches S1 and S2, and output selection switch S3, respectively.

An image signal which has been processed in a camcorder (not illustrated in Figure 1) and is input from the camcorder signal input terminal 3, is fed to third input terminals C1, C2 and C3 of first and second input selection switches S1 and S2, and output selection switch S3.

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A playback signal from second deck 40 is fed to fourth input terminal D1 of first input selection switch S1, while a playback signal from first deck 30 is fed to fourth input terminal D2 of second input selection switch S2.

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Accordingly, the first deck 30 records one of: a TV program which is output via TV tuner 20 linked to first selection terminal A1 of first input selection switch S1; the video input linked to second selection terminal B1; the camera input linked to third selection terminal C1; or the playback signal from second deck 40 linked to fourth selection terminal D1.

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Likewise, second deck 40 records one of: a TV program which is output via TV tuner 20 linked to first selection terminal A2 of second input selection switch S2; the video input linked to second selection terminal B2; the camera input connected to third selection terminal C2; or the playback signal from first deck 30 linked to fourth selection terminal D2.

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Meanwhile, if a user wants a PIP function so as to see a signal being recorded on both first and second decks 30 and 40, a control signal output from first and second control ports cp1 and cp2 of system controller 50, e.g. a logic low, sets first and second control switches SW1 and SW2 to first selective contacts a1 and a2, respectively. This routes the signals being recorded in first and second decks 30 and 40 to PIP processor 60. Here, both

25

a PIP on/off key and a main/secondary picture switching key are provided in key input means - such as keys installed on a remote controller or a VTR.

5 In the PIP processor 60, the image signal switched by first control switch SW1, i.e. the signal being recorded on the first deck 30 according to both the signal controlling on/off of PIP processor 60 output from third control port cp3 of system controller 50 in response to the key inputs and the signal for switching the main/secondary picture signal input source output from fourth control port cp4 of system controller 50, is received as the main picture signal, and the image signal routed through second control switch SW2, i.e. the signal being recorded on second deck 40, is received as the secondary picture signal.

15 A signal which has been processed in PIP processor 60 is directly transmitted to display means 80, as shown in Figure 2A, and a signal being recorded on the first deck 30 is displayed as the main picture while a signal being recorded on the second deck 40 is compressed to be displayed as the secondary picture or is modulated into a high-frequency signal RF in RF modulator 70 via second amplifier AMP2, and then is displayed on display means 80.

25 However, in case a user wants a PIP function in order to see signals being reproduced in first and second decks 30 and 40 as shown in Figure 2B, first and second control switches SW1 and SW2 are set to second selection contacts b1 and b2 by the control signal output from first and second control ports cp1 and cp2 of system controller 50, e.g. a logic high. Thereafter, signals reproduced by the first and second decks 30 and 40 are supplied to PIP processor 60.

As shown in Figure 2C, the PIP function is such as to simultaneously display the signal being recorded in first deck 30 and the signal being reproduced in second deck 40. Here, signals output from first and second control ports cp1 and cp2 of the system controller 50, e.g. a logic low and logic high, set first and second control switches SW1 and SW2 to first selection contact a1 and second selection contact b2, respectively. Thereafter, both the recording signal of first deck 30 and the playback signal of second deck 40 are supplied to PIP processor 60.

Figure 2D shows the case where the requested PIP function is to display both the signal being reproduced in first deck 30 and the signal being recorded in second deck 40. Here, signals output from first and second control ports cp1 and cp2, e.g. a logic high and a logic low, set first and second control switches SW1 and SW2 to second selection contact b1 and first selection contact a2, respectively. This operation supplies both the playback signal of the first deck 30 and the recording signal of the second deck 40 to PIP processor 60.

In the display means 80, the signal routed through first control switch SW1 and PIP processor 60 is displayed as the main picture, while the signal routed through second control switch SW2 is displayed as the secondary picture.

At this time, both the main picture signal input source and the secondary picture signal input source can be interchanged by simply operating a main/secondary picture switching key which is installed on the key input means. Such characters as "VTR-1" and "VTR-2" inserted on the respective main and secondary pictures by adding an OSD (On-Screen-Display character

generating apparatus) to the PIP processor 60, greatly benefits the user in recognizing image input sources of the respective main and secondary pictures.

5           A switching-over of the main/secondary audio signals follows that of the video signals. RF modulator 70 converts to a high frequency signal one input selected by system controller 50 from: a TV program output via the TV tuner 20 which is connected to the first selection terminal A3 of the output selection switch S3; a video input connected to the second selection terminal  
10   B3; a camera input connected to the third selection terminal C3; an input of the first deck 30 connected to the fourth selection terminal D3; an output of the first deck 30 connected to the fifth selection terminal E3; an input of the second deck 40 connected to the sixth selection terminal F3; and an output of the second deck 40 connected to the seventh selection terminal G3. The result  
15   is displayed on the display means 80, i.e. a television monitor.

          In addition, an output signal of the PIP processor 60 is input to the RF modulator 70 via the second amplifier AMP2 to be converted to a high-frequency signal and is then displayed on the display means 80.

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          Additionally, in the case where no PIP function mode is set by the user, switch selection of output selection switch S3 under the control of system controller 50, displays on display means 80 via RF modulator 70, the signal output from any of its input terminals. Among these are: the first  
25   input terminal A3 inputting the output signal of the tuner 20, the second input terminal B3 inputting a signal being transmitted to a line via isolation amplifier AMP1, the third input terminal C3 inputting the video signal already processed in the camcorder, the fourth input terminal D3 inputting a signal

being recorded on first deck 30 by switching over the first selection switch S1, the fifth input terminal E3 inputting the playback signal of first deck 30, the sixth input terminal F3 inputting a signal being recorded on second deck 40 by switching the second input selection switch S2, and the seventh input  
5 terminal G3 inputting a playback signal of second deck 40.

As described in greater detail above, the dual deck video tape apparatus having a PIP function has an advantage that video signals input via a multi-channel signal input source in a dual deck VTR can be switched over by a  
10 control switch during the respective recording or playback of a signal in each of two decks, and can be simultaneously displayed on a display means as a main and secondary picture using the PIP function. Further, the main and secondary pictures both displayed on a display means can be arbitrarily interchanged by switching the recording or playback signal of each deck. In  
15 addition, the present invention can also be applied to a colour video printer having dual decks.

The reader's attention is directed to all papers and documents which are filed concurrently with or previous to this specification in connection with this  
20 application and which are open to public inspection with this specification, and the contents of all such papers and documents are incorporated herein by reference.

All of the features disclosed in this specification (including any  
25 accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

Each feature disclosed in this specification (including any accompanying claims, abstract and drawings), may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature  
5 disclosed is one example only of a generic series of equivalent or similar features.

The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel  
10 combination, of the features disclosed in this specification (including any accompanying claims, abstract and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.



## CLAIMS

1. A dual deck video tape apparatus having a PIP function, including as one unit a first and a second deck each for recording and reproducing a video  
5 signal, the apparatus comprising:

input means including a tuner for tuning a broadcasting signal input via an antenna to an appropriate channel, a terminal for receiving a video signal via a video line, and a terminal for receiving a video signal from a video  
10 camera;

first input selection means for selecting either one of a video signal being transmitted to a multi-channel source of said input means or a playback signal of said second deck and inputting the signal to said first deck;  
15

second input selection means for selecting either one of a video signal being transmitted to said multi-channel source of said input means or a playback signal of said first deck and inputting the selected signal to said second deck;  
20

first and second switching means to switch between a recording signal and a playback signal of said first and second deck;

PIP means for receiving a signal switched by either one of said first and second switching means as a video signal for a main picture and a signal switched by either one of said first and second switching means as a video signal for a secondary picture, compressing said video signal of said  
25

secondary picture, and then displaying said signals as the respective main picture and secondary picture of a display means; and

5        system control means for controlling the switching of signal input sources for the respective main picture and secondary picture of said PIP means by way of controlling switching of said first switching means and second switching means, and controlling the operation of said PIP means by recognizing key data from a key input means.

10    2.     A dual deck video tape apparatus according to claim 1, wherein each of said first and second switching means consists of a control switch.

3.     A dual deck video tape apparatus according to claim 1 or 2, further comprising:

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output selection means for selecting one of video signals being transmitted to said multi-channel source of said input means, a recording signal or playback signal of said first deck, or a recording signal or playback signal of said second deck; and

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RF modulating means for modulating a signal selected through said output selection means into a high-frequency signal and outputting the signal to said display means.

25    4.     A dual deck video tape apparatus according to claim 3, in which both the main picture signal and secondary picture signal output from said PIP processing means are supplied to said RF modulating means to be displayed on said display means.

5. A dual deck video tape apparatus comprising, as a single unit:

first and second decks each for recording and reproducing a video signal;

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an image processing means for mixing two input signals of two respective input images and generating therefrom an output signal of an output image comprising the two input images as distinct images; and

10 control means for selecting said two input signals, under the control of a user, from input and output signals to and from said first and second decks, and external signals input to said apparatus.

6. Apparatus according to claim 5, further comprising any one or more  
15 of the features disclosed in the accompanying specification, claims, abstract and/or drawings, in any combination.

7. A dual deck video tape apparatus having a PIP function, substantially  
as hereinbefore described with reference to the accompanying drawings.

20

Patents Act 1977  
Examiner's report to the Comptroller under  
Section 17 (The Search Report)

17

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Relevant Technical fields

(i) UK CI (Edition K ) H4F (FGG, FGH, FGT, FDC)

(ii) Int CL (Edition 5 ) H04N 5/45, 5/262

Search Examiner

P J EASTERFIELD

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASES: WPI

Date of Search

8 JULY 1992

Documents considered relevant following a search in respect of claims

1-6

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
	NONE	

SF2(p)

GEM - doc99\fil000016

Category	Identity of document and relevant passages	Relevant to claim(s)

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